Notice of Allowability	**Application No.** 09/682,559	**Applicant(s)** HOGLE ET AL.	
	Examiner Douglas N Washburn	**Art Unit** 2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Information Disclosure Statement filed 21 June 2002*.
2. ☒ The allowed claim(s) is/are *1-29*.
3. ☒ The drawings filed on *19 September 2001* are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
   1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)
1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

EXAMINER'S AMENDMENT

1 The abstract of the disclosure is amended as follows:

[The systems and methods of the invention offer a] A method for providing a corrective modulation signal to suppress an acoustic pressure wave in an operational system. The method includes sampling the acoustic pressure wave generated in the operational system; [and] sampling a previously generated corrective modulation signal;[, the previously generated corrective modulation signal having parameters. The method further includes] performing fast Fourier transform processing on the sampled acoustic pressure wave;[.] a pair of single frequency discrete Fourier transform processing is performed on the sampled acoustic pressure wave;[. Also, the method includes] determining the frequency, phase and magnitude of a dominate pressure wave in the acoustic pressure wave based on the fast Fourier [transform processing] and [the] discrete Fourier transform processing;[. Further, the method includes] generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of the previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave.

Prior Art Cited

2 Wanke (US 3,936,606) teaches an acoustic receiver, amplifier and transmitter generating an anti-wave which is in-phase and of mirror symmetry with respect to a propagating acoustic wave. Wanke fails to teach sampling a previously generated corrective modulation signal; performing fast Fourier transform processing on a sampled acoustic pressure wave; performing a pair of single frequency discrete Fourier transform processing on a sampled acoustic pressure wave; determining the frequency, phase and magnitude of a dominate pressure wave in the acoustic pressure wave based on the fast Fourier and discrete Fourier transform processing; generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of a previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave.

Kumagai (US 5,380,190) teaches a pulse combustor wherein a compensating sound is generated in an exhaust conduit synchronously with pulsative explosion and combustion. The compensating sound has a sound pressure identical with that of a noise in the exhaust conduit but a phase opposite to that of the noise, thus effectively compensating the noise in the exhaust conduit and efficiently reducing the noise from an exhaust outlet. Kumagai is silent regarding sampling a previously generated corrective modulation signal; performing fast Fourier transform processing on a sampled acoustic pressure wave; performing a pair of single frequency discrete Fourier transform processing on a sampled acoustic pressure wave; determining the frequency, phase and magnitude of a dominate pressure wave in the acoustic pressure wave based on the fast Fourier and discrete Fourier transform processing; generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of a previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave.

Bozich et al. (US 5,386,689) teaches a method and a system for reducing acoustic levels of internal and external sound fields generated by gas turbine engines has several actuators to generate sound, several sensors to measure the acoustic levels, and one or more controllers, The controllers are adaptive self-learning neural networks that control the actuators to generate sound in order to effect the reduction of the internal and external sound field as measured by the sensors. Bozich is silent regarding sampling a previously generated corrective modulation signal; performing fast Fourier transform processing on a sampled acoustic pressure wave; performing a pair of single frequency discrete Fourier transform processing on a sampled acoustic pressure wave; determining the frequency, phase and magnitude of a dominate pressure wave in the acoustic pressure wave based on the fast Fourier and discrete Fourier transform processing; generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of a previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave.

Kondou et al. (US 5,445,517) teaches pressure variation of combustion noise is detected by a microphone set in a combustion chamber. The pressure propagation characteristic for the path from the gas flow control valve to the microphone is identified while the combustion apparatus is operating, and an adaptive control is made using one signal detected by an microphone and another signal produced by passing the signal of the microphone through a filter. A corrected anti-phase signal of combustion noise is computed by a coefficient updating circuit, and the computed result is inputted to a gas flow control valve. Kondou is silent regarding sampling a previously generated corrective modulation signal; performing fast Fourier transform processing on a sampled acoustic pressure wave; performing a pair of single frequency discrete Fourier transform processing on a sampled acoustic pressure wave; determining the frequency, phase and magnitude of a dominate pressure wave in the acoustic pressure wave based on the fast Fourier and discrete Fourier transform processing; generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of a previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave.

Brough (US 5,575,144) teaches a system for actively controlling pressure pulses in a gas turbine engine combustor. The system includes a means for sensing pressure pulses in the combustor, a first processing means for determining the amplitude and frequency for a predominant pressure pulse of the sensed pressure pulses, a second processing means for calculating an amplitude, a frequency, and a phase angle shift for a cancellation pulse to offset the predominant pressure pulse. Brough is silent regarding sampling a previously generated corrective modulation signal; performing fast Fourier transform processing on a sampled acoustic pressure wave; performing a pair of single frequency discrete Fourier transform processing on a sampled acoustic pressure wave; determining the frequency, phase and magnitude of a dominate pressure wave in the acoustic pressure wave based on the fast Fourier and discrete Fourier transform processing; generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of a previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave.

Blosser et al. (US 5,996,337) teaches a calorimetric sensor system provides signals indicative of the emissions concentration in the exhaust gases, the air/fuel ratio of the engine and whether the engine is operating lean or rich. The system can control industrial processes through small process perturbations affecting the compositions of process gases. A Fourier transform, specifically a discrete Fourier transform is used to analyze the signal. Blosser is silent regarding sampling a previously generated corrective modulation signal; performing a pair of single frequency discrete Fourier transform processing on a sampled acoustic pressure wave; determining the frequency, phase and magnitude of a dominate pressure wave in the acoustic pressure wave based on the fast Fourier and discrete Fourier transform processing; generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of a previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave.

Norris (US 5,966,452) teaches a method and apparatus for reducing acoustic noise waves in the vicinity of an electrically conductive plasma. A sensor detects a noise wave and generates a representative electrical noise signal. A signal analyzer analyzes the noise signal, a wave form generator generates a phase inverted, electrical interference signal based on the noise signal. Norris is silent regarding sampling a previously generated corrective modulation signal; performing fast Fourier transform processing on a sampled acoustic pressure wave; performing a pair of single frequency discrete Fourier transform processing on a sampled acoustic pressure wave; determining the frequency, phase and magnitude of a dominate pressure wave in the acoustic pressure wave based on the fast Fourier and discrete Fourier transform processing; generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of a previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave.

Allowable Subject Matter

3 The following is an examiner's statement of reasons for allowance:

Claim 1 recites, in part, "generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of the previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 2-7 depend from claim 1.

Claim 8 recites, in part, "a corrective modulation generator that generates a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency with maximum power information and maximum power information, the pressure phase information, and the modulation phase information, wherein the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 9-22 depend from claim 8.

Claim 23 recites, in part, "means for generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of the previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 24 recites, in part, "generating a sinusoidal corrective modulation signal to suppress the acoustic pressure wave based on the frequency, phase and magnitude of the dominate pressure wave and the parameters of the previously generated corrective modulation signal, the corrective modulation signal being at substantially the same frequency as, and generally 180 degrees out of phase with, the acoustic pressure wave". This feature in combination with the remaining claimed structure avoids the prior art of record.

Claims 25-27 depend from claim 24.

Claim 28 recites, in part, “at least one discrete Fourier transform processing portion that performs single frequency discrete Fourier transform processing, the single frequency discrete Fourier transform processing including performing a first single frequency discrete Fourier transform on a first part of the sample, which is processed by the signal processing portion to generate pressure $phase_K$ information, and performing a second single frequency discrete Fourier transform on a second part of the sample, which is processed by the signal processing portion to generate pressure $phase_{K-1}$ information, and a modulation phase processing portion, the modulation phase processing portion generating modulation $phase_K$ information and modulation $phase_{K-1}$ information based on the sample of the previously generated corrective modulation”. This feature in combination with the remaining claimed structure avoids the prior art of record.

Claim 29 recites, in part, “means for providing a gain control based on the frequency error, the phase error and the magnitude of the dominate pressure wave, the gain control generating a gain signal to adjust the corrective modulation signal.”. This feature in combination with the remaining claimed structure avoids the prior art of record.

It is these limitations, which are not found, taught or suggested in the prior art of record, and are recited in the claimed combination that makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

4 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas N Washburn whose telephone number is (571) 272-2284. The examiner can normally be reached on Monday through Thursday 6:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DNW

John Barlow
Supervisory Patent Examiner
Technology Center 2800

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DNW

John Barlow
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